affect survival for all patients or for any subgroup (p = 0.4). Independent predictors of reoperation were younger age, CE prosthesis, and previous median sternotomy. In patients over 65 years old, choice of prosthesis did not affect actual freedom from reoperation (99 ± 1/97 ± 1/95 ± 2% for CE vs 98 ± 1/98 ± 1/98 ± 1% for SJ, p = 0.4). Given that prosthesis outlast most patients undergoing AVR, choice of prosthesis has little effect on survival. Prosthesis selection should be individualized based on issues of anticoagulation and reoperation.

999 Risk and Detection of Transplant Coronary Artery Disease

Tuesday, March 18, 1997, Noon–2:00 p.m.
Anaheim Convention Center, Hall E
Presentation Hour: Noon–1:00 p.m.

999-149 Prognostic Value of Dobutamine Stress Echocardiography After Heart Transplantation

C.H. Spes, H. Mudra, S.D. Schnaack, V. Klauss, A.R. Tammen, J. Rieber, K.-H. Henneke, P. Überfuhr, K. Theisen, C.E. Angermann. *University of Munich, Munich, Germany*

Dobutamine stress echocardiography (DSE) is a useful method for diagnosis of allograft vasculopathy. In this study, the prognostic value of DSE (5–40 μg/kg/min; assessment of wall motion abnormalities (WMA) using a 16 segment model) was analyzed in 83 patients (P, mean age 50 ± 10 years) late (≥12, mean 47 ± 32 months) after heart transplantation (HTX). Cardiac events (myocardial infarction, need for revascularization, heart failure, re-HTX, death) were registered during follow-up. DSE was also compared with coronary angiography and intravascular ultrasound (IVUS, grades 1–6). *Results:* 167 DSE, 144 angiograms and 87 IVUS were performed (1–4 studies/P). Within an observation period of 1602 patient months, 15 events occurred in 10 P: revascularization, n = 9; re-HTX, n = 2; heart failure, n = 2; death, n = 2. 14 of 80 abnormal DSE and 1 of 87 normal DSE were followed by an event. Abnormal DSE studies followed by an event (n = 14) showed WMA in more segments (7.3 ± 4.2 vs. 5.0 ± 3.1, p < 0.05) and a higher wall motion score index (1.52 ± 0.30 vs. 1.34 ± 0.26, p < 0.05) than abnormal DSE without event. Newly developed WMA or an increase in WMA score index were indicators of events in serial studies. 13 of 53 abnormal angiograms and 2 of 93 normal angiograms were followed by an event. In P with no or mild intimal hyperplasia by IVUS (mean IVUS grade < 3.0; 26 of 87 studies), no event occurred. *Conclusions:* Noninvasive DSE may add relevant prognostic information in P late after HTX. In P with normal DSE, probability of clinical events is low. The prognostic value of a normal DSE study is comparable to that of a normal angiogram after HTX.

999-150 Comparative Value of Dobutamine Stress Thallium-201 Single Photon Emission Computed Tomography and Echocardiography in the Diagnosis of Cardiac Allograft Arteriopathy

N.M. Lakkis, S.F. Nagueh, Z.-X. He, J.J. Mahmarian, M.S. Verani. *Baylor College of Medicine, Houston, TX, USA*

Annual coronary angiography continues to be the standard procedure to monitor for the development and progression of coronary allograft arteriopathy after heart transplantation. Exercise perfusion imaging appears to provide suboptimal results in these patients (pts). This study was designed to assess the comparative value of high-dose (maximum 40 μg/kg/min) dobutamine thallium-201 single photon emission computed tomography (SPECT) and dobutamine stress echocardiography (DSE) to detect allograft arteriopathy. Thirty-nine pts, 28 of whom were males, with a mean post transplant follow-up time of 48 ± 6 (SD) months, were studied. All patients except 3 had coronary angiography 1 day after the dobutamine stress test. Medications at the time of the test included calcium antagonists (n = 19), ACE inhibitors (n = 13), and beta blockers (n = 4). The mean baseline and peak heart rates were 86 and 139 bpm (p < 0.0001), respectively. Only 3 pts developed ischemic ST-segment changes and 2 had chest pain. The comparative sensitivity, specificity, positive and negative predictive values were as follows: Tl-201 SPECT: 85%, 78%, 46%, 96%; and DSE: 57%, 94%, 67%, 91%. In conclusion, this study is unique for 2 reasons: first, it is the first to assess the comparative value of both dobutamine Tl-201 SPECT and DSE done concomitantly in cardiac transplant recipients; second, on the basis of our results, dobutamine stress testing is well tolerated and merits consideration as a screening test for allograft arteriopathy late after cardiac transplantation.

999-151 Relationship Between Dobutamine Induced Regional Wall Motion Abnormalities and Coronary Flow Reserve in Heart Transplant Patients Without Angiographic Coronary Disease

P.A. Jackson, K.O. Akosah, A.J. Minisi, H.M. Ibrahim, D. Kirchberg, P.K. Mohanty. *McGuire VA Medical Center and Medical College of Virginia, Richmond, VA, USA*

Regional wall motion abnormalities (RWMA) demonstrated by dobutamine stress echocardiography (DSE) is a sensitive indicator of coronary artery disease (CAD) in the heart transplant (HT) recipients. However, RWMA has been shown to occur in patients with angiographically "normal" coronary arteries (ANCA). We sought to determine if abnormal responses to dobutamine in this setting are related to vasomotor abnormalities (VMA) in coronary circulation manifested by abnormal coronary flow reserve (CFR). *Methods:* CFR and wall motion score index (WMSI) derived from DSE were measured in 19 consecutive stable HT patients. CFR was measured with the doppler Flo-Wire and intracoronary adenosine. DSE was performed within 24 hours of CFR. *Results:* CFR and RWMA responses were correlated in 32 coronary arteries (19 patients) (Table). Five patients (7 coronary arteries) were excluded for poor acoustic window. Twenty-five coronary arteries exhibited normal CFR (> 2.0). Of these, 21 (84%) corresponding all segments exhibited RWMAs. Four coronary arteries with corresponding wall segments that exhibited no RWMAs also had normal CFR. There was no relationship between abnormal DSE and CFR in 10 of 14 (71%) patients.

WMSI	CFR (n = 14)	p-Value
1.0	2.5 ± 003	NS
> 1.0	2.8 ± 0.6	NS

These data suggest that dobutamine stress induced RWMA without angiographic CAD has poor correlation with CFR and that these induced RWMA may be related to factors other than VMA in the HT patients.

999-152 Homocysteine, a Risk Factor for Atherosclerotic and Thromboembolic Vascular Disease, is Higher in Patients who Have Undergone Orthotopic Cardiac Transplantation

A. Moustapha, A. Gupta, D.W. Jacobsen, R. Green, M. Goormastic, E.M. Tuczu, J. Young, R. Hobbs, K. James, K. Robinson. *The Cleveland Clinic Foundation, Cleveland, OH, USA*

Background: Atherosclerosis is a major complication of heart transplantation. A high plasma homocysteine (HCY) concentration is a risk factor for atherosclerosis and may be caused by low folate, vitamin B12 or B6 levels and renal failure.

Aims and Methods: To detect abnormalities of homocysteine metabolism in transplant patients, total fasting plasma levels were measured in 106 recipients (82 men, 24 women, age 50 ± 9 yrs) and were compared with age and sex matched controls. Levels of folate, vitamins B12 and B6 as well as creatinine were also determined.

Results: Homocysteine levels were higher in recipients (18.5 ± 8.8 vs 11 ± 3.8 μmol/L, p < 0.001) as was serum creatinine (1.85 ± 1.6 vs 0.97 ± 0.2 mg/dl, p < 0.001). A high homocysteine (> 90 th percentile for controls, 14 μmol/L) was seen in 66 recipients (62%) compared to 11 controls (10%, p < 0.01). Homocysteine correlated negatively with folate (r = −0.46, p < 0.01) and vitamin B12 (r = −0.23, p < 0.01) and positively with creatinine (r = 0.19, p = 0.08).

	HCY μmol/L	B12 deficiency < 125 pmol/L	Folate deficiency < 5.2 nmol/L	B6 deficiency < 20 nmol/L
Controls	11.03 ± 3.83	5 (4.8%)	2 (1.9%)	3 (2.9%)
Recipients	18.52 ± 8.84*	4 (4%)	20 (20%)*	19 (20%)*

*p < 0.001

Conclusions: A high plasma homocysteine concentration is often seen in transplant patients and is related to deficiencies of folate and vitamin B6 as well as renal dysfunction. The relationship between high homocysteine levels and atherosclerotic complications of cardiac transplantation require further study.

999-153 Cardiac Allograft Rejection is an Independent Risk Factor for Graft Coronary Artery Disease Late After Transplantation

H.P. Brunner-La Rocca, W. Kiowski. *Division of Cardiology, University Hospital, Zurich, Switzerland*

The development of graft coronary artery disease (g-CAD) has become an

TUESDAY POSTER